Universität Zürich
Zentrum für Zahnmedizin
Abteilung für Kieferorthopädie und Kinderzahnmedizin
Leiter: Prof. Dr. Theodore Eliades

Arbeit unter Leitung von Dr. med. dent. Richard Steffen

Stomatopedia: A stomatological online-database for students, practitioners and lecturers of medicine and dentistry

INAUGURAL-DISSERTATION
zur Erlangung der Doktorwürde der Zahnmedizin
der Medizinischen Fakultät
der Universität Zürich

vorgelegt von
Fabienne Carmen Suter
von Hünenberg und Zug ZG

Genehmigt auf Antrag von Prof. Dr. Theodore Eliades
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Inhaltsverzeichnis

1. Zusammenfassung

Hintergrund. Stomatologie, orale Pathologie und Grenzgebiete der Dermatologie gelten (bereits) als wichtige Bestandteile des Studiums der Zahnmedizin an der Universität Zürich. Um wichtige Lerninhalte dieser Fachgebiete aber besser auf Kinder und Jugendliche bezogen zu vermitteln, wurden in der Abteilung Kinderzahnmedizin und Kieferorthopädie am Zentrum für Zahnmedizin seit einigen Jahren sowohl fachspezifizierte Vorlesungen als auch ein online Ausbildungsmodul in Form eines Quiz eingeführt.

Ziel. Mit „*Stomatopedia: A stomatological online-database for students, practitioners and lecturers of medicine and dentistry*“, einer online Datenbank in Englisch, sollen die Lerninhalte der Stomatologie und oralen Pathologie übersichtlich, anhand von visuell gut dokumentierten Krankheitsbildern und mit Hilfe von aktuellen wissenschaftlich fundierten Inhalten übermittelt werden.

Methode und Resultat. Zuerst wurden die verschiedenen Fachrichtungen der Stomatologie und oralen Pathologie in Themenbereiche unterteilt und in eine Diagnostik erleichternde Ordnung gebracht. Besondere Berücksichtigung erfährt dieses Ordnungsschema in Bezug auf die orale Pathologie Kindern und Jugendlichen. Die weiterführenden Unterkapitel orientieren sich nach aktuellen Erkenntnissen aus der Literatur und aus einer Übersicht von wissenschaftlichen Studien zu den betreffenden Bereichen. Fotografien dienen als erklärende, aussagekräftige Bespiele, welche das klinische Bild der jeweiligen Kondition bzw. des jeweiligen Krankheitsbildes verdeutlichen sollen. Entstanden ist ein Nachschlagewerk zum aktuellen Stand der Stomatologie und oralen Pathologie mit dem Schwerpunkt auf Kinder und Jugendliche, welches auf einer dafür konzipierten online-Plattform http://stomatopedia.com/ oder http://stomatopedia.ch/ veröffentlicht werden wird, und dort von Studenten, Lehrkräften und Praktizierenden der Zahnmedizin genutzt werden kann.

Ausblick. Im weiteren Verlauf soll „Stomatopedia“ fortlaufend aktualisiert und gegebenenfalls ergänzt werden. Einen Datenaustausch mit anderen Universitäten oder praktizierenden Fachpersonen kann zudem zu einem schnellen und erweiterten Informationsaustausch führen

und zur Aktualisierung von Stomatopedia.ch beitragen.

2. Einleitung

Die Stomatologie, orale Pathologie und Grenzgebiete der Dermatologie sind als medizinische Grundlagen in der Ausbildung der Zahnmedizin an der Universität Zürich fest verankert. Die gleichen Lehrinhalte mit Schwerpunkt auf Kinder und Jugendliche, werden jedoch in der zahnmedizinischen Ausbildung über mehrere Fachbereiche verstreut und wenig altersspezifisch vermittelt. Seit einigen Jahren ist es das Ziel der Station für Kinderzahnmedizin und Kieferorthopädie am Zentrum für Zahnmedizin diese Lerninhalte in kompakter Form sowie Problem- und Patientenspezifisch zu vermitteln. Erreicht wird dies unter Anderem durch spezielle Vorlesungen in Oraler Pathologie und Stomatologie bei Kindern und Jugendlichen, sowie einem online Ausbildungsmodul: *Stomatologie und orale Pathologie in der Kinderzahnmedizin: Ein Quiz*. An diesem online Ausbildungsmodul haben in den letzten Jahren immer mehr befreundete Universitäten teilgenommen. Durch den grundlegenden Aufbau als ein ”free data sharing” Kurs kommt es zwischen den Fachleuten der Universitäten zu einem regen Austausch an Bildern und Informationen. Diese Fachinformationen fliessen kontinuierlich in den Datenpool der Abteilung Kinderzahnmedizin ein. In der Zwischenzeit nehmen ca. 40 Zahnmedizinische Abteilungen der verschiedensten Universitäten, weltweit an diesem Quiz teil (Stand 2012). Aus dieser erfreulichen Situation haben sich aber auch Probleme ergeben. Die Lerninhalte welche vermittelt werden sind zu aller meist Bild gebunden. Das heisst zu den verschiedenen Krankheitsbildern werden vor allem diagnostisch, situative Bilder vermittelt. Durch den Aufbau der online-Fortbildung bedingt kommt es zu wenig Austausch von ergänzenden Fachinformationen.

Die Dissertation „*Stomatopedia: A stomatological online-database for students, practitioners and lecturers of medicine and dentistry“* hat sich zum Inhalt gesetzt diese Lücken zu schliessen. Sie vermittelt aktuelle wissenschaftlich fundierte Inhalte, ergänzend zu visuell gut dokumentierten Krankheitsbildern.

Ziel dieser Dissertation ist es auch die Fülle der fachübergreifenden Informationen in eine möglichst überschaubare Ordnung zu bringen. Eine solche Ordnung muss sich zudem an den neuesten Erkenntnissen der verschiedenen Fachrichtungen orientieren.

3. Aufbau der Online-Plattform

Die Homepage *Stomatopedia* beinhaltet eine Übersicht über die Stomatologie, orale Pathologie und Grenzgebiete der Dermatologie bezogen auf Kinder und Jugendliche. Anhand von Fachliteratur und mit Hilfe von Studien, welche mehrheitlich nicht mehr als 10 Jahre zurückliegen, wurde vorerst das grosse, fächerübergreifende Gebiet der Stomatologie, der oralen Pathologie und der Dermatologie in eigene Themenbereiche unterteilt. Diese Themenbereiche wurden dabei wie folgt festgelegt:

- Anatomische Grundlagen
- Terminologie
- Effloreszenz Lehre
- Heterotrophien
- Virale Erkrankungen
- „Andere Infektionen“
- Aphten
- Nosologischer Formenkreis
- Allergischer Formenkreis
- Pigment- und Farbveränderungen
- Dermatologische und systemische Erkrankungen
- Tumoren

Jeder dieser Themenbereiche beinhaltet ein Inhaltsverzeichnis zur Übersicht über die weiterführenden Unterkapitel, eine Definition des Themenbereiches sowie die jeweiligen Unterkapitel und Literaturangaben. Die Unterkapitel enthalten jeweils einen erklärenden/ beschreibenden Text der betreffenden Kondition bzw. des betreffenden Krankheitsbildes, welcher anhand neuster Literatur Recherchen und aktuellen Veröffentlichungen zusammengestellt wurde. Die Beschreibungen der Krankheitsbilder beinhalten unter anderem:

- das jeweilige klinische Bild
- Symptome
- eventuelle Begleitsymptome
- Ätiologie
- Inzidenz
- Prognose
- Behandlungsoptionen
- mögliche Komplikationen

Ergänzend werden diesen Lerninhalten dazu passende, aussagekräftige Fotografien zur Seite gestellt, welche das klinische Bild visualisierend verdeutlichen sollen.

4. Beschreibung und Verwendung der Online-Datenbank

Diese Mediendissertation soll die grosse Anzahl an fachübergreifenden Informationen aus der Stomatologie, orale Pathologie und aus den Grenzgebieten der Dermatologie bündeln und in einen geordneten, übersichtlichen Zustand auf eine dafür konzipierte online Plattform bringen. Die Inhalte sollen mit den neuesten Erkenntnissen aus der Wissenschaft und Literatur übereinstimmen. Im Sinne von einem online Lexikon stellt „Stomatopedia“ ein katalogartiges Online-Nachschlagewerk in englischer Sprache dar, welches von Studenten, Praktizierenden und Lehrkräften genutzt werden kann. Eine geringe Eintrittsgebühr soll Schutz vor Missbrauch und fachfremden Usus bieten. Gleichzeitig werden mit dem Erlös dieser Gebühr Forschungsprojekte von ausgewählten Partneruniversitäten der Universität Zürich unterstützt.

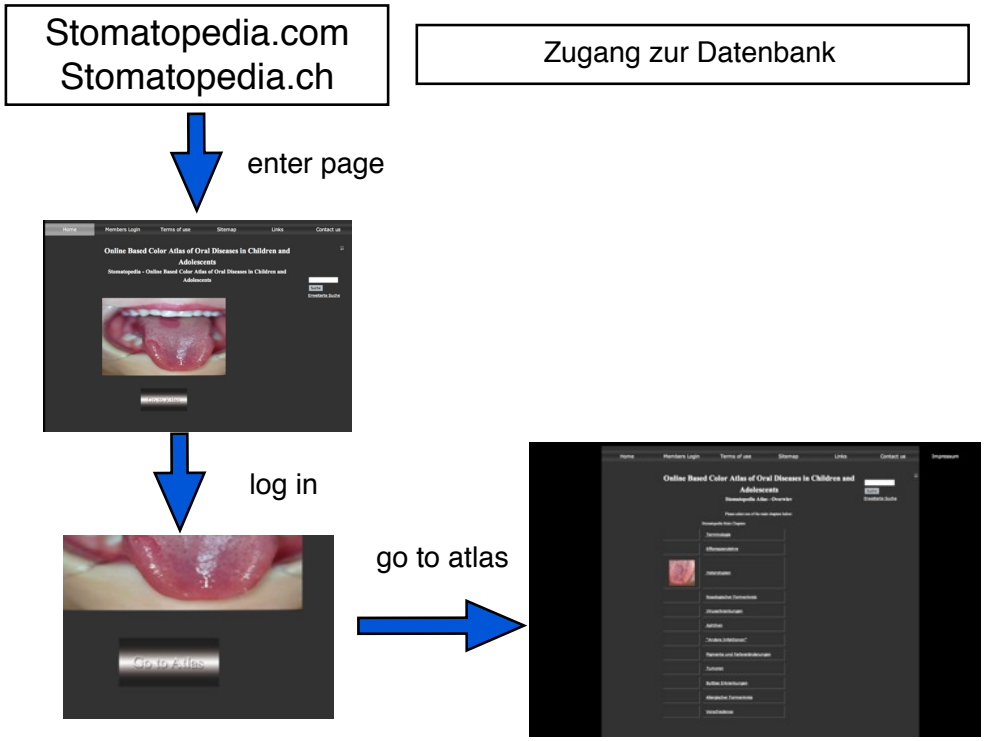

ABBILDUNG 1: ZUGANG ZUR DATENBANK

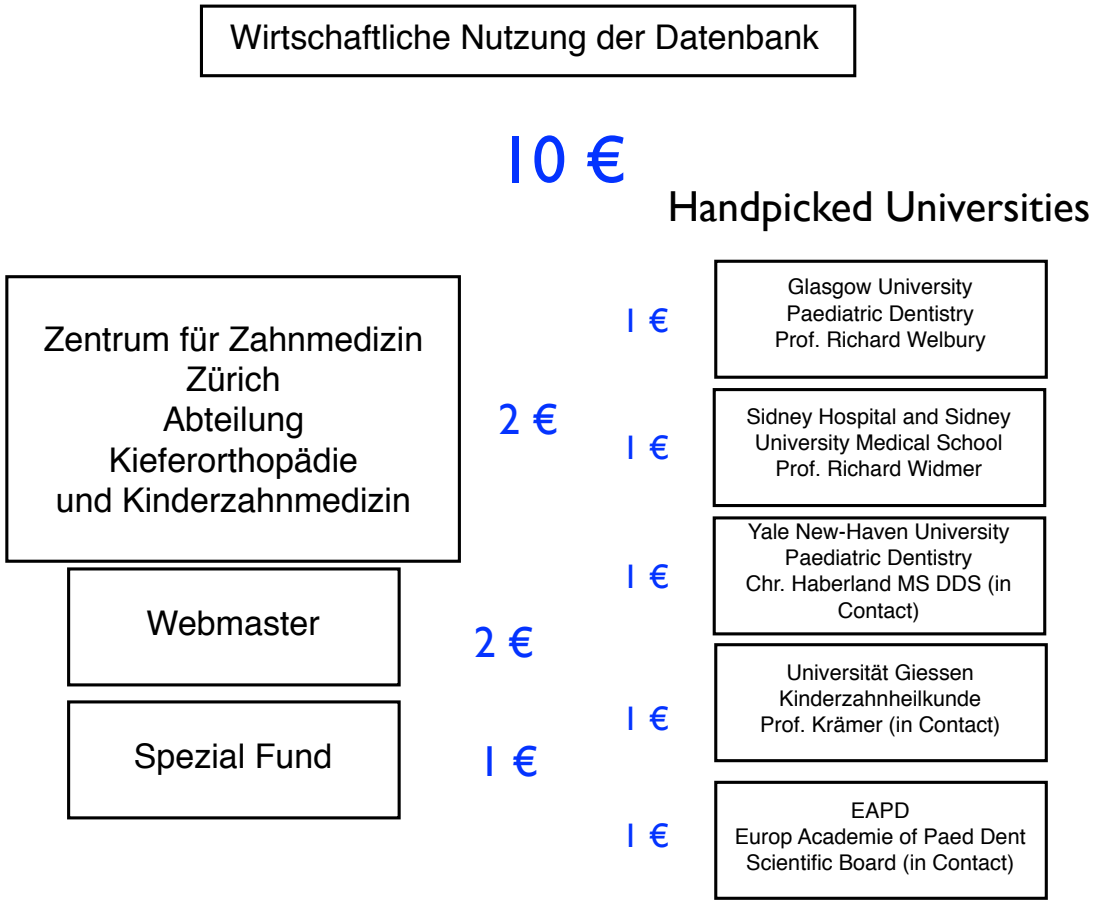

ABBILDUNG 2: WIRTSCHAFTLICHE NUTZUNG DER DATENBANK

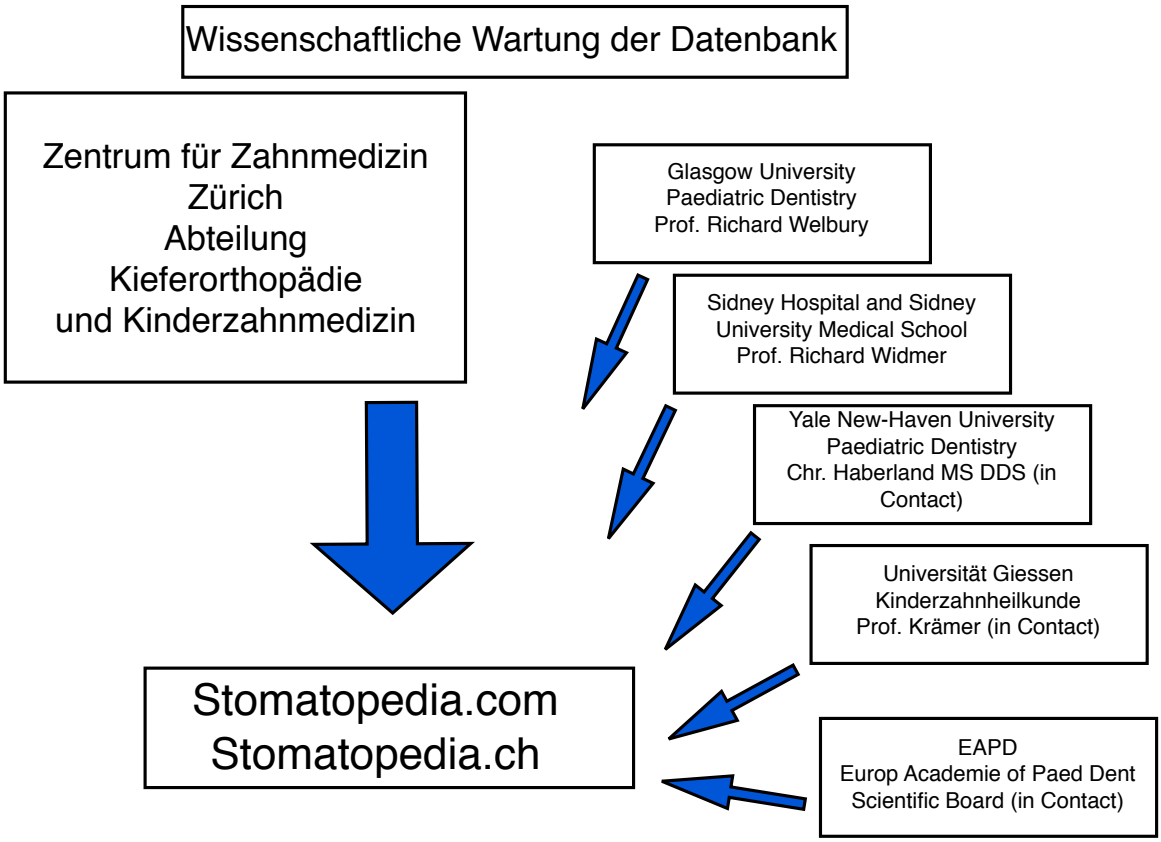

ABBILDUNG 3: WISSENSCHAFTLICHE WARTUNG DER DATENBANK

Wie beim bereits bestehenden und rege genutzten online Ausbildungsmodul: ”*Stomatologie und orale Pathologie in der Kinderzahnmedizin: Ein Quiz”* auch, soll durch „free data sharing“ ein länderübergreifender Austausch von Bildern und Informationen stattfinden, welche die Homepage durch neuste Fotografien und wissenschaftliche Erkenntnisse fortlaufend updaten und ergänzen können. Daraus würde einen schnellen Informationsaustausch, speziell auch zwischen den verschiedenen Universitäten, ermöglicht.

5. Literatursuche

5.1. Zeitraum der Literatursuche

Die Literatursuche erstreckte sich über den Zeitraum vom 9. Februar 2013 bis zum3. März 2014.

5.2. Identifizierung der relevanten Daten

Die Unterkapitel wurden kapitelweise evaluiert und anschliessend wurde eine Auswahl von Quellen nach definierten Kriterien für das jeweilige Kapitel getroffen, wobei stets auf ein bestimmtes Quellensuchmuster geachtet wurde.

5.3. Definition der Quellen

5.3.1. Wissenschaftliche Datenbanken

- MEDLINE/ PubMed: Führende wissenschaftliche Datenbank der Medizin und Biologiehttps://ncbi.nlm.nih.gov
- Google scholar: Medizinische Suchseite von Google http://scholar.google.ch/

5.3.2. Handsuche

Anhand vom Katalog der E Paper des Zentrums für Zahnmedizin (ZZM) Zürich wurde eine Handsuche durchgeführt:

http://www.zzm.uzh.ch/bibliothek/kataloge/ejournals.html

Nach den im Kapitel 5.5. definierten Kriterien wurden zu jedem Kapitel noch eine separate Handsuche durchgeführt.

5.4. Definition der Suchbegriffe

Für jedes einzelne Unterkapitel wurden unabhängig zum restlichen Kapitel drei Suchbegriffe in die Suchleiste der Datenbank eingegeben, welche dann Papers zur Auswahl stellten, die die gesuchten Informationen enthielten. Zum Teil musste auch auf die Option „erweiterte Suche“ zugegriffen werden, um die Auswahl einzuschränken. Dies ist sinnvoll, um zum Beispiel aktuelle Übersichtsarbeiten über ein bestimmtes Thema zu erhalten.

Anhand folgendem *Beispiel des Kapitels „Tumors“* sollen solche für die Suche verwendeten Begriffe aufgelistet werden:

Kapitel	**Suchbegriffe**
Lipoma	Lipoma intraoral/ lipoma mouth/ lipoma review
Fibroma/ fibromatous lesions	Fibroma mouth/ gingival fibromatosis
Hemangioma	Hemangioma oral cavitiy/ hemangioma tongue
Lymphangioma	Lymphangioma tongue/ lymphangioma treatement
Retention cyst	Maxillary retention cyst/ oral mucocele/ oral cyst treatment/ ranula
Extravasation cyst	Extravasation mucocele/ treatment oral mucocele
Salivary gland tumors	Salivary gland tumors review/ pleomorphic adenoma/ warthin tumor
Virus induced tumors	Hpv oral cavity review/ oral condyloma acuminatum/ oral viral infections
Malignant tumors	Oral melanoma location/ oral squamous cell carcinoma review/ oral pigmented lesions

Die Tabelle zeigt, dass für die einzelnen Kapitel jeweils unter mehreren Begriffen gesucht werden muss, damit die relevanten Informationen zu den Kapiteln gefunden und zusammengestellt werden können.

Mit einer anschliessenden Handsuche wurden darauf einzelne, dem Titel nach für die Kinderzahnmedizin relevanten Studien ausgewählt, das jeweilige Review gelesen und bei passendem Inhalt das betreffende Paper als Quelle verwendet.

5.5. Selektion der Literatur

Die folgenden Kriterien waren wegleitend bei der Auswahl der bei der Handsuche gefundenen Veröffentlichungen. Durch die unten aufgeführten Kriterien sollte ermöglicht werden eine möglichst zeitaktuelle aber auch nicht zu umfangreiche Basisinformation zu jedem Thema bereit zu stellen.

Die gewählten Kriterien dafür waren:

Es sollte möglichst immer

- eine aktuelle deutschsprachige Veröffentlichung
- eine aktuelle englisch sprachige Veröffentlichung
- eine möglichst aktuelle und qualitativ hochstehende Übersichtsarbeit (Review; peer review) zum Thema

enthalten sein.

Die Auswahl der relevanten Arbeiten wurde nach dem ”Vier Augen Prinzip”, das heisst von zwei Begutachtern durchgeführt.

5.6. Graphische Darstellung des Suchverfahrens

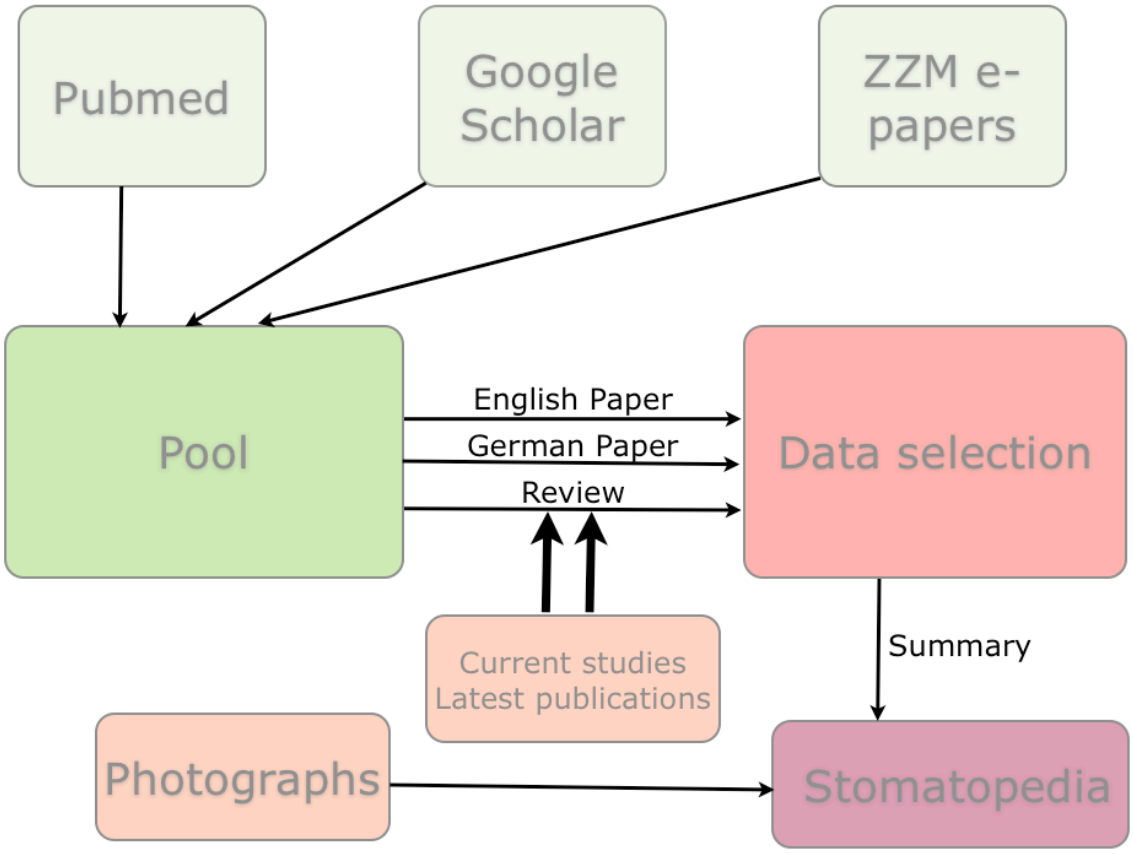

ABBILDUNG 4: GRAPHISCHE DARSTELLUNG DES SUCHVERFAHRENS

6. Quellenverzeichnis

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6.1.1. Basisliteratur

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6.2. Fotografien

Alle verwendeten Fotografien wurden bei Kindern und Jugendlichen unter dem Einverständnis der Erziehungsberechtigten durchgeführt. Die Fotografien wurden von Dr. med. dent. Richard Steffen über mehrere Jahre während seiner Tätigkeit als Kinderzahnarzt und von der Abteilung für Kieferorthopädie und Kinderzahnmedizin der Universität Zürich aufgenommen und zur Verfügung gestellt.

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6.3. Wissenschaftlicher Text der Homepage

Nachfolgend sind alle Textpassagen (in Englisch), welche in der Homepage ***stomatopedia*** erscheinen, aufgelistet.

6.3.1. Anatomical basics

Definition

In the following chapter the intact, healthy structures of the oral cavity are described with the aid of photographs. For orientation all relevant anatomical structures can be identified by la legend.

The photographs are taken from different children with either primary dentition or mixed dentition in combination with a (mainly) healthy oral cavity including physiological mucosal structures.

The basic graphics are taken from a clinical report sheet, made by the Department of Oral Surgery and Stomatology at the University of Bern and have been slightly modified for the purpose of this chapter.

Lips

The red of the lips, the mucosa, the commissures and the labial sulcus are the major anatomical structures of the lips. The red of the lips contains, unlike the mucosa and the adjacent skin, neither perspiratory or sebaceous glands nor hair follicles, and appears reddishly due to the very thin epithelium. The labial commissures are located directly behind the labial angle/ angulus oris and include a mucosal area which has a diameter of about 1.5 cm. The labial mucosa reaches from the red of the lips until 1 cm above the vestibular sulci.

Buccal mucosa/ sulcus

The buccal mucosa is located between the superior and the inferior vestibular sulcus and stretches from the labial commissures in anterior direction to the frontal palatal arch in posterior direction. Usually, in the area opposite the maxillary second molar, the opening of the parotis

duct is visible and shows a minor elevation of the mucosa. The sulcus extends from the mucogingival junction to 1cm of the deepest point of the sulcus into the area of the buccal mucosa. The mucous membrane is either parakeratotic or nonkeratinized.

Gingiva

The ginigiva is the part of the oral mucosa, which covers the alveolar process/ processus alveolaris. The keratinized attached gingiva is firmly bound to the underlaying periosteum of the alveolar bone and therefore non-relocatable. Its appearance is paler than the other oral mucosa and normally displays a surface stippling. Located between the teeth, the interdental gingiva forms a papillae in either pyramidal or “col“ shape. The so called free or marginal gingiva represents the terminal 0.5 to 2mm border of the gingiva and surrounds the teeth. Its tissue is mobile and shows no stippling.

++ Bild Kiefer mit Legende ++

Palate/ P.arches/ Tonsils

The palate consists of both the hard and the soft palate. The keratinized masticatory mucosa of the hard palate is firmly attached to the underlying periosteum. The soft palate is located between the two palatal arches including the uvula and involves highly vascularized mucosa which seems notably redder than the mucosa of the hard palate.

The palatine raphe runs in the median plane of the palate and ends in the papilla incisiva (anterior). It marks the point where the two embryonal palatal shelves unit.

Numerous minor salivary glands, the Glandulae palatinae, are located in the submucosal tissue

++ Bild Mundhöhle mit Legende ++

Tongue

The tongue is anatomically divided into different parts:

- base or root/ radix linguae: located between the palatal arches. This part contains the smallest salivary glands.

- upper surface/ Dorsum linguae: triangular-shaped area behind the tip of the tongue

- border of the tongue/ Margo linguae: starts 1cm behind the tip of the tongue and proceeds until the frontal palatal arch

- underside/ ventral surface of the tongue: ranges from the fold of the mouth base to 1cm behind the tip of the tongue

- tip of the tongue: is a circular area with a radius of 1 cm

On the upper surface, the mucosa contains numerous papillae with different mechanical function. We find filiform papillae and papillae with taste buds fungiform and vallatae papilla.

Floor of mouth

The floor of mouth includes the soft tissue which is located between the hyoid and the body of mandible. The thin non-keratinized mucosa presents typical structures like:

- Plica sublingualis: a paired narrow bulge which runs from the Caruncula sublingualis angular in posterior direction.

- Caruncula sublingualis: a small papilla located lateral of the lingual frenulum. It contains the common opening of the excretory ducts of the sublingual und submandibular glands.

- Frenulum linguae: The lingual frenulum is a mucosal fold which connects the floor of mouth to the ventral surface of the tongue and, therefore, limits the movements of the tongue

6.3.2. Terminology

Pathological basic forms and medical terms

((Tabelle))

Hyperkeratosis	thickening of the stratum corneum
Parakeratosis	inflammatory thickening of the stratum corneum
Dyskeratosis	premature pathological keratinisation
Acanthosis	thickening of the stratum spinosum
Papillomatosis	pathological elongation of the connective-tissue papillas
Acantholysis	intercellular edema
Spongiosis	intercellular edema within the epidermis
Lichenification	irritation of the skin fields (epidermis and cutis)
Pachydermia	hypertrophy of the interstitial connective tissue
Atrophy	putrefaction of all layers of the skin
Efflorescence	clinically perceptible change which normally indicates skin disorders
Heterotrophy	tissue displacement at unusual locations
Hemorrhagic diathesis	an increased bleeding propensity during the course of a general illness can lead to / Petechiae = punctiform confluent bleeding / Suggillation/ Bruising/ Ecchymosis= small hemorrhagic spot / Suffision = large hemorrhage / in the oral mucosa
Enanthema	nonspecific inflammatory change of the mucous membrane
Exanthema	disease-specific inflammatory change of the mucous membrane (children‘s diseases= classic exanthemas)

Erythema	redness of skin by inflammation (descriptive term)
Mukogingival deformation	deviation from the regular extension and morphology of the gingiva and the alveolar mucosa (possibly with underlying bone)
Gingival recession	localisation of the gingival margin apical to the enamel-cementum junction

In German: Pathologische Grundformen und Fachbegriffe

((Tabelle))

Hyperkeratose	Verbreiterung der Hornschicht
Parakeratose	entzündliche Verbreiterung der Hornschicht
Dyskeratose	frühzeitige pathologische Verhornung
Akanthose	Stratum spinosum verdickt
Papillomatose	krankhafte Verlängerung der Bindegewebspapillen
Akantholyse	interzelluläre Flüssigkeitsansammlung
Spongiose	Akantolyse über grössere Bereiche
Lichenifikation	Vergröberung der Hautfelder durch Epidermis und Kutis
Pachydermie	Hypertrophie des interstitiellen Bindegewebes
Atrophie	gleichmässige Verschmälerung aller Hautschichten
Effloreszenz Hauterkrankungen	klinisch wahrnehmbare Veränderung durch welche i.d.R. charakterisiert werden. „Hautblüte“
Heterotropie	Gewebsverlagerung an ungewöhnlichen Ort

Hämorrhagische Diathese erhöhte Blutungsneigung bei Allgemeinerkrankung kann zu Petechien = Punktförmige, konfluierende Blutungen / Sugillationen = kleinflächige Blutungen / Suffisionen = grossflächige Blutungen / in der Mundschleimhaut führen

Enanthem unspezifische entzündliche Veränderung im Bereich der Schleimhäute

Exanthem krankheitsspezifische entzündliche Veränderung im Bereich der Schleimhäute. (Kinderkrankheiten= Klassische Exantheme)

Erythem Rötung der Haut durch Entzündung (beschreibender Begriff)

Mukogingivale Deformation Abweichung von der normalen Ausdehnung und Morphologie der Gingiva und alveolären Mukosa. (u.U.mit darunter liegenden Knochen)

Gingivale Rezession Lokalisation des Margo gingivale apikal der Schmelz-Zement-Grenze

6.3.3. Efflorescence doctrine

Primary efflorescences are skin alterations which are caused directly and which emerge from healthy skin or mucosa.

Secundary efflorescences are skin alterations which arise as a result of transformation, inflammation, remission or healing of primary efflorescences.

Primary efflorescences

Macula

It is the only efflorescence which is located on the level of the skin; it predominantly involves a color change rather than a change in consistence.

Examples: see next slide

((Tabelle))

Change in the fill state of the blood vessel Roseola / lentil-sized spots as the result of vasodilatation; MORBILLI, TYPHUS, LUES / Enanthema / widely spread multiple efflorescences; ALLERGIC REACTION

Bleeding (extravasation) into the tissue Purpura / dot-like exanthematic spread; AGRANULOCYTOSIS, COAGULATION ABNORMALITIES / Vibices / strip-like spread; PLAGUE / Petechiae / pinhead-sized dots; FLU / Ecchymosis / extensive irregular hematoma; TRAUMA

Endo- or exogenous pigments Nevus / moles, freckles / Tattoo

Urtica (wheal)

Localized plateau-like rising caused by increased capillary permeability of the cutis; inflammatory irritant edema.

It is very characteristic for loose cell tissues such as can be found in the face, the tongue, the lips or the larynx.

Partially considerable extension e.g. QUINCKE EDEMA

Vesicula

An elevated, in the skin level located lesion that is filled with liquid and has the potential to reach the size of a pea. It heals without scarring.

Normally it occurs within infectious processes; ECZEMA, FLU

Bulla (blister)

subcoronal: between horny layer (Stratum corneum) and epidermis; IMPETIGO CONTAGIOSA

intraepidermal: located in the epidermis; PEMPHIGUS

subepidermal: located between the cutis and epidermis; DERMATITIS HERPETIFORMIS

Pustule (blister)

Blister filled with pus, sterile or with a bacterial infection. Heals without scarring.

A special type of a pustule is the POCK which shows a small indentation and heals with scarring.

Tuber/ Node

A due to cell proliferation induced bulging, like the papule but obviously bigger (>1cm). Normally, it heals with scarring.

Tuber - superficial

Node - lower

Secundary efflorescences

Squama (scaly)

Beyond the normal level extending, desquamative mass of the horny layer (Stratum corneum).

hyperkeratosis - thickening of the horny layer

parakeratosis - „precipitous“ cornification; PSORIASIS

Crust (scab)

Deposits of the skin from secretions (blood, lymph, pus...), frequently the horny layer is missing.

Crust formation on the lips; ERYTHEMA EXSTUDATIVUM MULTIFORME, HERPETIC INFECTIONS, CARCINOMA

Erosion (graze)

Superficial epithelial loss that often occurs as a result of blisters or after a trauma. Emergent intercellular fluid weeps the erosion.

Erosions of the mucosa with a coated layer and a surrounding inflammatory wall are APHTAE.

Ulcus (ulcer)

Deep tissue defect which reaches at least the cutis. It always heals with scarring.

It arises from decomposition of pathologically changed tissue; GRANULOMA, TUBERCULOSIS

Vulnus (wound)

Profound substance defect caused by trauma.

Rhagade (fissure)

Rhagades are stub-shaped separations of the skin due to a loss of coherence.

They often manifest at the change-over from skin to mucous membrane; CORNER OF THE MOUTH RHAGADE

Cicatrix (scar)

Replacement of the skin by connective tissue with rough structural change.

athrophic cicatrix- thinned epidermis; ACNE VULGARIS

hypertrophic cicatrix- thickened collagenous areas of the cutis; KELOID

6.3.4. Heterotopia

Definition

Heterotopia refers to an organ which normally exists in its structure but is located beyond its physiological localization. It may be congenital, idiopathic as a local disorder of differentiation or iatrogenic source. A heterotopia are usually benign, asymptomatic and discovered mostly coincidentally. Therapeutic interference is only required if the organ's function is affected or for aesthetic reasons.

Cheek lesions

Linea alba buccalis

A white stripe that occurs in the buccal mucosal region along the occlusal plane is referred to as linea alba buccalis or intercalary line. In most cases it is bilateral. The condition is frequent and physiological. It represents normal epithelium with hyperorthokeratosis, typically associated with cheek and lip biting and sucking. It is possible to regress spontaneously and no intervention is induced.

Morsicatio buccarum

A whitish hyperkeratosis in the buccal plane of the cheek mixed with tattered patches and areas of ulceration and erythema refer to the clinical picture of morsicatio buccarum. It represents a more distinctive form of linea alba buccalis and is also caused by increased cheek biting and/or sucking, often times combined with an often psychological background as the result of stress or anxiety. The lesions are bilateral and can be accompanied by the same condition on the lateral border of the tongue and/or on the lips.

Leukoedema

Leukoedema is usually found as an asymptomatic, greyish-white, diffuse, bilateral lesion in the buccal mucosa. The lesions do not rub off but disappear by stretching. The epithelium is thicker than normally. This oral condition is benign and commonly seen in the majority of the population. However it is supposed to occur more frequently in individuals who smoke or frequently ingest alcohol. No treatment is indicated.

Fordyce granules

Heterotopic, sebaceous glands appear yellow, pinpoint on the oral mucosa. They are mostly located bilaterally as an extension of the oral fissure but are sometimes also found on the mucosa of the lips, palate, gingiva or the retro-molar pad region. The oval glands typically coalesce and form large plaques which can reach a diameter of several centimeters. This variant is seen in 20 per cent of the population and is considered to be totally harmless. The lesions are asymptomatic and do not require any therapy.

Traumatic ulcer

A traumatic ulcer appears as areas of erythema hedging a removable yellow fibrinopurulent membrane, often adjoining an area of hyperkeratosis. The condition is common and can be caused by a lot of different sources of trauma such as thermal, electrical, chemical or mechanical. An accurate anamnesis and examination is essential to identify the source of the ulcer. If it is identified and can be removed, the lesion should heal up within two weeks. Otherwise a biopsy should be taken.

<u>Tongue lesions</u>

Lingua geographica

The wandering rash of the tongue or also called erythema migrans (Lingua geographica) is a benign, inflammatory change of the surface of the tongue. It manifests itself in red spots on the surface of the tongue, which are generally surrounded by a white border that is changing continually. Typical symptoms are a burning sensation on the tongue and sensitivity especially for spicy or hot food. The symptoms can be avoided through absence of said food or through moderate consumption. Medications are normally not necessary. Therapeutic options are possible, for example with tannins or antihistamines. Although the efficiency and general effects of the aforementioned therapeutic options are not adequately documented, they have the distinct potential to alleviate the symptoms.

Lingua plicata

Lingua plicata, also known as fissured, scrotal or plicated tongue or dissecting glossitis, represents one deep or multiple grooves on the dorsal surface of the tongue. It is an idiopathic, mostly incidentally discovered variant which occurs relatively frequently (up to 20 % in the general population). The grooves and fissures can disappear spontaneously. Because microorganisms and debris accumulate, halitosis, local irritation and inflammation can occur. In this case, mechanical washing and tongue brushing are a sufficient treatment.

Lingua plicata is more common in people with Melkersson-Rosenthal syndrome (MRS), down syndrome, Sjögren syndrome, psoriasis or chronic granulomatous disease and is in approximately 20 per cent of cases accompanied by the geographic tongue condition.

Lingua villosa

The hairy tongue (Lingua villosa) is characterised by an elongation of the filiform papillae that appears to be hairy and is commonly located on the dorsal surface of the tongue. The often brown or black colored appearance may be a result of substance abuse, smoking, poor oral hygiene or chromogenic microorganisms among the papillae. Besides the unaesthetic appearance, the hairy tongue can be accompanied by symptoms such as dysgeusia, nausea or

halitosis. A treatment is not required but it is possible to improve the condition by avoiding the suspected causes or brushing the tongue with a soft toothbrush.

Lingua rhomboidea mediana

The median rhomboid glossitis is marked by a smooth, erythematous, shiny, sharply circumscribed, rhomboid shaped plaque with loss of papillae. Though it is usually asymptomatic, a burning or itching is possible. It is commonly located on the dorsal midline of the tongue and 1.5-4 cm in length and 0.5-1 cm in width. It is frequently coincides with candidal infection. Therefore the recommended therapy is topical antifungals.

Lingua glabra

The lingua glabra or also called atrophic glossitis is characterised by a glossy, smooth appearance with either a red or pink background. It results from atrophy of the papillae on the dorsal surface of the tongue and is sometimes accompanied by a burning sensation of the tongue. The condition is often associated with nutritional deficiencies (like iron, riboflavin etc.), underlying disease or medication use. Furthermore, it is linked to pellagra, syphilis and tuberculosis as so called Hunter-glossitis. The therapy depends on the specific cause of the atrophic condition.

Lingua lobata

The lobulated tongue is characterised by multiple indentations, scarred grooves on the edge and/or surface of the tongue, surrounded by quadrangular fields with rounded corners. The surface contour appears irregular. Mostly, it indicates the final stage of syphilis or represents an x-linked inherited condition.

Lingua bifida

The bifid tongue or, alternatively called, cleft tongue is based on a whole or partially split midsagittal plane of the tongue. It exists as isolated or complex foetal malformation. A cleft tongue can cause orthodontic, sociologic and aesthetic problems. Surgery at any age is recommended.

Other tongue lesions

Ankyloglossia Congenital too short, thick lingual frenulum(,) which connects the underside of the tongue to the floor of the mouth. A surgical solution is only necessary(,) if the function of the tongue is restricted. Occasionally ankyloglossia occurs together with ectodermal dysplasia.

Lateral lingual tonsils It is lymphatic tissue located symmetric on the back, lateral edges of the tongue and is often not easy to be distinguished from hypertrophic foliata papillae. The surface appears furrowed and red. The palpable lesion is soft. If it comes to a tonsillitis it can be painful.

Heterotopic vallata papillae Heterotopic location of the vallata papillae(,) mostly on the dorsal surface of the tongue, sometimes also on the palatine arch can upset a patient even though it is neither painful nor does it necessitate a therapeutic intervention.

Lateral tongue impressions Disproportion of the size of the tongue and the jaw or parafunctions like tongue thrust can lead to lateral tongue impressions

Thyroid glands hypertrophy The so called lingual goiter manifests itself as a knotty, highly vascularized excess tissue on the root of the tongue. Surgical intervention is only needed if the function is restricted.

Lingual varicosities Prominent veins on the bottom side of the tongue can occur more frequently with increasing age. Multiple venectasias can lead to the image of the so called „caviar-tongue“. Therapeutic intervention is not indicated.

Lip lesions

Commissural lip pits

The labial pits describe a rare anomaly, which shows blind-ended epidermal invaginations of the lip mucosa. Their diameter is usually less than 4mm with their depth being 1 to 4mm. Mostly, they include fistulae which are normally asymptomatic, but if they are linked to a salivary gland they can cause secretion and concern the patient. In that case, a sufficiently deep excision with the removal of the involved glands is required. The condition is suggested to represent a genetic disorder exhibiting autosomal dominant inheritance.

Double lip

This anomaly represents a double upper lip, seldom in combination with a double lower lip. When the patient smiles, the lip is being divided by a transverse groove into two borders. The redundant tissue or hypertrophic mucosa can be surgically removed with good cosmetic results and function. Double lip is mostly inherited but can also be acquired through a traumatic injury. A combining of the aforementioned anomaly with the occurrence of both blepharochalasis and thyroid enlargement often indicates a case of Ascher‘s syndrome.

Labial varices

Vermiculated, irregularly extended venules, so called varices, are more often seen on the lower lip and generally occur with increasing age. Characteristics of a varix are a localised increased pigmentation and a bluish-purple colour. Contrary to a hemangioma, there is no spontaneous regression . If the masticatory function is restricted, surgical intervention may be induced for aesthetic reason or to confirm the diagnosis.

Palate lesions

Torus palatinus and exostoses

Exostoses present benign bony overgrowths of the maxilla or mandible. The most common region of exostoses is located on the midline of the palate, known as palate tori. Exostoses can occur as single or multiple phenomenons which grow slowly and continuously over years with nearly no size limiation. Their existence, however, often remains unnoticed due to the condition staying mostly asymptomatic unless the overlaying mucosa becomes traumatised.

The condition is associated with temporomandibular dysfunction, tooth attrition, several medications and medical conditions.

Indications for a surgical removal are not only given mostly if the situation interferes with a planned removable appliance, but sometimes also if the size of the tori interferes with the oral function or if there are concerns of malignancy.

Uvula bifida

The bifid or cleft uvula is the mildest form of the more severe manifestation of the congenital palatine cleft or also called palatoschisis. The cleft can involve not only a part but, at times, also the entire length of the uvula. This harmless malformation, which occurs in circa 1 per cent of the general population neither inhibits speech nor swallowing functions and does, therefore, not require therapy.

Gingiva lesions

Retrocuspid papilla

This normal anatomic structure called retrocuspid papillae, or in short RCP, shows mostly bilateral mound or sessile papules on the lingually attached gingiva posterior to the mandibular cuspids. Its diameter is 2-4 mm. The RCP has the same colour as the surrounding gingival tissue and has a soft consistence. It is more prevalent in females and children and may spontaneously retreat with age. No treatment is indicated.

Fibrous developmental malformation

Mostly found on the maxillary alveolar tuberosity regions but theoretically possible everywhere on the attached gingiva, this malformation represents a bilateral painless fibrous overgrowth. Normally it coincides with the eruption of the teeth and can cover their crowns. A treatment is only indicated if mechanical problems occur.

Toothbrushing-induced injuries

Wrong toothbrushing technics like excessive horizontal scrubbing in combination with high pressure can lead to gingival injuries. Chronically wrong toothbrushing may result in gingival irritations, injuries, gingival hyperplasia, gingival recessions and eventually damage of the tooth substance. Additional factors such as plaque and misaligned teeth may expedite the lesions.

The therapy consists of applying correct brushing methods in combination with sensitive brushing materials.

Extraoral lesions

Facial Hemiatrophy

This condition is also called Parry-Romberg syndrome and shows an atrophy of the tissues, characteristic skeletal and dental changes located on only one side of the face. Normally the first manifestation is the disappearance of the adipose tissue, starting in childhood. The cause is unknown but some congenital cases have been described. It is sometimes accompanied by epilepsy, gland disorders, trigeminal neuralgia and skin pigmentation. Multi-disciplinary management concerned with keeping the function, symptomatic treatment and potential plastic reconstruction is induced.

Masseteric Hypertrophy

The condition appears as a swelling over the ascending ramus of the mandible. It can exist uni- or bilaterally and becomes more distinctive by pressing the teeth together. Mostly, it manifests an aesthetical problem but it is also possible to coincide with pain and/or with a prominent exostoses at the angle of the mandible. Clenching, malocclusion, bruxism or temporomandibular joint disorders can cause the hypertrophy but it is also idiopathic. For other than aesthetical reasons, no treatment is induced.

Pigmented lesions

Normal pigmentation caused by increased melanin synthesis can appear not only on all parts of the mucosa but also on the skin and as any number of different manifestations. It shows clinically asymptomatic areas that range from brown to black in colour and indicate single or multiple lesions of varying size. In areas of pressure and friction, the pigmentation becomes more prominent and it normally increases with aging. Moreover, areas of dark discoloration are very common on dark-skinned patients. A detailed list of all the variations of oral pigmentation can be found in the chapter entitled “pigments and colour changes“ of this atlas.

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6.3.5. Viral diseases

Definition

Viral diseases are viral infections caused by viruses. There are different possible ways of transmission. Mostly, including the typical children‘s diseases, the viruses are transmitted via droplet infection.

Listed in this chapter are the commonest viral diseases with oral manifestation. Some are more pronounced than other but generally display a primary or only obligatory involvement of the oral mucosa.

Because symptoms often first occur in the oral cavity, the patients frequently consult a dentist first before visiting a physician. In that way it is not only important to recognize a viral disease to find the right treatment but also to refer the patient to a doctor if necessary.

It happens sometimes that painful and viral symptoms of the oral mucosa facilitate to the neglect of oral hygiene. The resulting gingivitis could encourage a super-infection or overlay the underlying viral disease.

Attention! Scarlet fever is indeed not caused by viruses but belongs to the typical children‘s diseases and is therefore categorised as such in this chapter .

Viral diseases with more or less obligatory involvement of the oral mucosa

Varicella

Varicella zoster virus or colloquially called „chickenpox“ is highly contagious and belongs to the group of herpes viruses. Prodromal symptoms are usually non-existent. After an incubation period of 11-21 days, the typical, strong itching exanthema occurs. The vesicles turn after a few hours into pustules and in the end into eschar. All the different efflorescence stages occur together and are also possible to be present as painful enanthema on the oral mucosa and

tongue. The healing takes about 2 weeks. Symptomatic therapy is eventually induced, antibiotics or virostatic agents are only necessary if complications arise.

Pathogen: Varicella-Zoster Virus/ Herpes Simplex Virus Type 3

Transmission path: droplet infection, contact with skin lesions

Incubation time: 11-21 days

Contagiousness: one day before the outbreak until the lesions crust over

Prodromal symptoms: usually absent

Symptoms: Pruritus, different stages of efflorescences

Treatment: symptomatically, ZnO-balm

Complications: seldom, bacterial superinfection, scarring

Measles

The measles virus may have serious complications like pneumonia, super-infections or encephalitis. It is generally very contagious during the prodromal stadium. About 2 weeks after infection, prodromal symptoms like fever, cough and red eyes occur. The buccal mucosa begins to show bright red spots with a diameter of 1-2mm and a white lesion in the centre, the so-called Koplik‘s spots. A few days after, the for measles characteristic exanthem, the maculopapular rash, occurs and last for about 3 more days

Pathogen: Measles Virus, genus Morbillivirus of the family Paramyxoviridae

Transmission path: droplet infection

Incubation time: 10-14 days

Contagiousness: highest during the prodromal symptoms

Prodromal symptoms: red eyes, fever, cough, Koplik‘s spots

Symptoms: characteristic maculopapular skin rush, high grade fever, generalized lymphadenopathy, laryngitis, reduced general condition

Treatment: symptomatically

Complications: viral and bacterial superinfections (encephalitis, myocarditis, pneumonia)

Scarlet fever

Scarlet fever is an acute infectious disease with a typical exanthema and tonsillitis (,) due to exotoxins of beta-haemolytic streptococci and is, therefore, no viral disease. After an incubation period of 2-8 days, prodromal symptoms like tonsillitis, high grade fever or reduced general condition show up. After 2 days, perioral, a butterfly like rush is a further typical sign, giving the erythematous exanthema of the skin a sand paper feel (which in a further process starts to desquamate). Intraoral, the tonsils are reddened and purulent, the tongue is first white coated and after 4-5 days it becomes smooth, bright red with swollen papillae and strongly resembles the so-called „raspberry tongue“.

Treatment with antibiotics is useful and can prevent complications.

Pathogen: Group A beta-hemolytic Streptococci (no virus!)

Transmission path: droplet infection, seldom smear infection

Incubation time: 2-8 days

Contagiousness: until 24 hours after the first dose antibiotic

Prodromal symptoms: sore throat, high grade fever, reduced general condition, furred tongue

Symptoms: erythematous exanthema of the skin, raspberry tongue, tonsillitis, pharyngitis

Treatment: Penicilline G/ antibiotics

Complications: otitis media, myocarditis, purulent lymphadenitis, acute rheumatic fever etc.

Rubella

Rubella or also called German measles is a harmless viral infection which is only reveals symptoms in 50 per cent of the patients. The most important complication occurs in pregnant woman where it can cause rubeolar embryofetopathy. 14-21 days after infection a prodrome of fever and slightly swollen lymph nodes is followed by a pea-sized, non-confluent, maculated, bright red exanthema which lasts a maximum of than 5 days. An oral manifestation is only seen in the prodromal stadium in the form of an enanthema in the soft palate.

Pathogen: rubella virus, a single-stranded RNA virus

Transmission path: droplet infection, diaplacentally

Incubation time: 14-21 days

Contagiousness: 2-4 days before the outbreak of the exanthema until it is gone

Prodromal symptoms: fever, enanthema on the soft palate

Symptoms: non-confluent, maculated, bright red exanthema

Treatment: symptomatically

Complications: embryofetopathy in infection during pregnancy

Erythema infectiosum

The „fifth disease“ or also called „slap-cheek disease“ is a viral infection with the parvovirus B19. It mostly occurs in children aged between 6 and 15 years. After an incubation period of 7-14 days, a general feeling of illness and fever may come up accompanied by a butterfly-shaped erythema on the facial skin and a perioral paleness, later on the extremities and the trunk ring and girland-like, partly itchy erythema. From the moment when the rush appears, the virus is no longer infectious. The fifth disease shows no oral manifestation.

It heals spontaneously within 2 weeks and usually needs only supportive treatment.

Pathogen: human parvovirus B19

Transmission path: droplet infection

Incubation time: 7-14 days

Contagiousness: 10-14 days until the exanthema appears

Prodromal symptoms: -

Symptoms: butterfly-like erythema on the facial skin, later ring and garland-like erythema on extremities and trunk

Treatment: symptomatically

Complications: arthritides in adults, extremely rarely bacterial superinfections

Mumps

Mumps virus or epidemic parotitis is characterised by a non-purulent, firstly unilateral and later mostly bilateral swelling of the parotid gland. It proceeds in 60per cent of the patients asymptomatic. After 12-26 days of incubation, both fever and pain uni- or bilateral on facial areas occur. Characteristic is a protruding ear lobe as the result of the considerable swelling of the parotic gland. The oral manifestation is a reddened, oedematous papilla parotidea with clear, serous saliva. The virus is generally self-limiting and does not need any medical intervention except symptomatic treatment.

Complications are male infertility through oophoritis, meningoencephalitis, pancreatitis or orchitis.

Pathogen: paramyxovirus

Transmission path: droplet infection, contact infection

Incubation time: 12-26 days

Contagiousness: 7 days before the symptoms appear until about 9 days after

Prodromal symptoms: fever, reduced general condition

Symptoms: fever, facial pain, swelling of the parotid gland(s)

Treatment: symptomatically

Complications: meningoencephalitis, pancreatitis, orchitis, oophoritis

Roseola

„Roseola“, „sixth disease“, „Exanthema subitum“ or also called „rose rush of infants“ belongs to the group of herpes viruses (HHV 6). 5-15 days after the infection, a sudden high fever (until 40°C) occurs and lasts for about 3-5 days with barely no reduction of the general condition.

A transient, maculopapular, nondesquamating rash on trunk and extremities can follow and last until 3 more days. There is normally no oral manifestation. Primarily roseola is an illness of young children not older than 4 years of age.

Pathogen: Herpes Simplex Virus Type 6

Transmission path: droplet infection

Incubation time: 5-15 days

Contagiousness: until the fever abates

Prodromal symptoms: -

Symptoms: abrupt onset of high fever, followed by a rash

Treatment: symptomatically

Complications: febrile convulsions, neurologic symptoms

Gianotti-Crosti Syndrome

This syndrome shows a papular acrodermatitis of children and is also known as „papulovesicular acrolated syndrome“ and „papular acrodermatitis of childhood“. The aetiology is unknown but is assumed to be associated with the Hepatitis B or Epstein-Barr-Virus. The classic finding shows a multiple red-brown, pruritic papulovesicular exanthema mostly located on the extremities and the face. The papules can be partly confluent. It starts abruptly and may be accompanied by hepatosplenomegaly, lymphadenopathy, pharyngitis, tonsillitis or fever. Enanthema in the oral cavity are possible. The condition is self-limiting within 4 to 8 weeks.

Pathogen: unknown, associated with hepatitis B virus or Epstein-Barr virus?

Transmission path: droplet infection (if viral ethiology)

Incubation time: depending on the ethiology

Contagiousness: until the exanthema shows up

Prodromal symptoms: sometimes pharyngitis, upper-airway infection or diarrhea

Symptoms: papulovesicular exanthema, casually associated with tonsillitis, lymphadenitis, pharyngitis, fever

Treatment: symptomatically

Complications: Liver infection, reduced liver function

Mononucleosis

Epstein-Barr virus (EBV) is the causative agent of the infectious mononucleosis or the so-called „kissing disease“. Primary infection occurs mostly in adolescence. Symptoms are severe tiredness, sore throat, adenopathy and sometimes spleno- or hepatomegaly. Typical oral manifestations are palatal petechiae, especially located at the transition of the soft to the hard palate and exsudative pharyngitis and tonsillitis. The tonsils are covered with pseudomembranous, white-yellow coatings.

Treatment lies in adequate hydration, analgesics and antipyretics. Once the acute phase has passed (after some days till weeks), myalgias and fatigue can persist over a few months. A reactivation of the virus is possible.

Pathogen: Epstein-Barr Virus

Transmission path: droplet infection

Incubation time: 8-21 days

Contagiousness: 1-3 weeks

Prodromal symptoms: -

Symptoms: generalised lmyphadenitis, severe tiredness, sore throat, adenopathy, exsudative pharyngitis and tonsillitis

Treatment: symptomatically

Complications: seldom

Viral flu

The viral flu or influenza can be caused by several different influenza-viruses. It comes up mostly seasonal and epidemic in all age groups. The typical symptoms include high grade fever, head- and bodyaches, dry cough etc. start often suddenly. Frequently but not regularly, symptoms on the oral mucosa are possible to appear within the first 24 hours of a flu and last for 7-10 days. A diffuse reddening of the throat, the tonsils and the soft palate is likely to occur. Furthermore, a rather rare characteristics of influenza are the so-called „flu points“, meaning grouped yellow-white, 1-2 mm specks, located on the buccal mucosa and the lip mucous membrane. Moreover, gingivitis or flat ulcers may also be present.

Pathogen: influenza-viruses

Transmission path: smear infection, droplet infection

Incubation time: 1-4 days

Contagiousness: a few hours before the symptoms show up until one day after recovery

Prodromal symptoms: -

Symptoms: fever, head-/bodyaches, dry cough, possibly accompanied by diarrhoe, attack of sweating, pharyngitis , weakness

Treatment: symptomatically

Complications: bacterial superinfections, bronchitis, pneumonia, sinusitis

HIV infection

HIV infected patients often develop oral lesions. The most typical oral manifestations are candidosis, angular cheilitis, oral hairy leukoplakia, linear gingival erythema, Kaposi‘s sarkoma, necrotizing ulcerative gingivitis or periodontitis and non-Hodgkin lymphoma. Atypical ulcers, salivary glands diseases or other viral infections are additionally possible symptoms.

The lesions can appear as solitary or combined disorders. In most cases, the tongue is involved. The wide range of oral manifestation of the virus can provide valuable prognostic and diagnostic information.

Pathogen: HIV virus

Transmission path: blood or mucous membrane contact with infected blood, sperm, vaginal fluids and other body fluids (except saliva)

Incubation time: 2-6 weeks

Contagiousness: depends on the concentration of the virus in the body fluids

Prodromal symptoms: -

Symptoms: mononucleosis-like symptoms, persisting efflorescences, fungal diseases, recurring pneumonal infections

Treatment: HIV-pharmaceuticals

Complications: AIDS (acquired immunodeficiency syndrome)

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Viral diseases that mainly affect the oral mucosa

Angina herpetica

Herpangina (zachorsky) is associated with various enteroviruses, especially with Coxsackie virus group A. It is an acute infection which occurs mostly within the first two years after birth and more frequently in the summer months. It starts with sore throat, dysphagia, fever and headache and within the following 24-48 hours diffuse erythema and vesicular eruption of the oral mucosa occur. The lesions are characteristically located on the soft palate, the oropharynx and rarely involve the buccal mucosa or the tongue. The vesicles are small, multitudinous and leave painful, plain ulcers after rupture with a red halo. Symptomatic treatment may be induced.

Pathogen: various enterovirus serotypes, coxsackievirus A5

Transmission path: droplet infection or via the „fecal-oral route“

Incubation time: 2-6 days

Contagiousness: a few days before the lesions appear until they have healed

Prodromal symptoms: rapidly increasing high fever, diffuse erythema on the soft palate

Symptoms: painful vesicular eruption of the oral mucosa, fever, nausea, headache, sore throat

Treatment: symptomatically

Complications: bacterial superinfection

HFMD

The hand, foot and mouth disease is caused by the coxsackievirus, especially type A 16. Mostly occurring in children under 10 years, the highly contagious disease shows symptoms like small 1-3 mm erythematous papulo vesiclular eruptions over hands, feet and knees maybe accompanied by low grade fever and sore-throat. In the oral cavity, on the buccal mucosa, occur ulcerating, aphthous-like lesions, 3-7 mm in diameter, surrounded by a red halo. HFMD is a self-limiting disease in which the lesions heal within one week. Complications like myocarditis are very seldom.

Pathogen: various enterovirus serotypes, coxsackievirus A16

Transmission path: droplet infection or via the „fecal-oral route“

Incubation time: 4-8 days

Contagiousness: a few days before the lesions appear until they have healed

Prodromal symptoms: -

Symptoms: low grade fever, vesicles on hands, feet, aphthous-like lesions on the oral mucosa

Treatment: symptomatically

Complications: bacterial superinfection

Literature

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Viral diseases that affect only the oral mucosa

Gingivostomatitis herpetica

Herpetic stomatitis expresses the initial manifestation of the herpes simplex virus type 1 and 2. The lesion appears normally just once and mostly during childhood. After an incubation period of 2-7 days, general symptoms like fever, emesis and fatigue occur in combination with swelling of the palate, the gingiva and the regional submandibular lymph nodes. The numerous vesicles that follow rupture rapidly and turn into painful aphthous-like ulcers, typically located on the anterior part of the mouth. Bad breath and sialorrhea are characteristic. The lesions heal within 10-14 days. Symptomatic treatment is induced, virostatic agents may be conducive if used at an early stage. Reactivation of the virus causes the common herpes labialis.

Pathogen: Herpes Simplex Virus Type 1 or 2

Transmission path: droplet infection, contact with lesions

Incubation time: 2-7 days

Contagiousness: until the lesion crust over

Prodromal symptoms: fever, fatigue, muscle aches, cervical and submandibular lymphadenopathy

Symptoms: sialorrhea, foeter ex ore, aphthoid lesions/ ulcerations

Treatment: symptomatically

Complications: bacterial superinfections, eczema herpeticum, herpes simplex encephalitis

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6.3.6. „Other infections“

Definition

Listed in this chapter are infectious diseases which are caused either by bacteria, fungi, parasites, prions or viruses. In some cases there is no involvement of the oral mucosa but there are manifestations of the diseases in the perioral areas which a dentist should be able to recognize.

Most skin infections caused by bacteria involve the gram-positive bacteria Staphylococcus and Streptococcus species.

Oral candidiasis

Oral candidiasis is a general term for infections with blastomycetes of the genus candida, mostly candida albicans. The infection manifests itself in various forms but primarily as „pseudomembranous“ candidiasis or, more commonly called, „oral thrush“. It usually shows asymptomatic, confluent white plaques which can be wiped off. The underlying mucous membrane appears erythematous. The plaques are possible to occur everywhere on the oral mucosa and consist of fungal hyphae, fibrin and desquamated epithelial cells.

Candida species belong to the normal oral flora but may lead to candidiasis predominantly in individuals who are immunodeficient, take pharmalogical agents, in children, in denture wearers or people with nutritional deficiencies. The treatment lies in the correction of the underlying predisposing factor and anti-fungal agents may are indicated

NUG

Necrotizing ulcerative gingivitis is an acute progressive and very painful infection associated with Prevotella intermedia, fusiform bacteria and spirochetes. It occurs mostly in combination with emotional stress, smoking, poor diet, poor hygiene and HIV infection or other diseases with

immunosuppression. The papillae appear bright red, swollen and ulcerative. Gingival spontaneous bleeding and pseudomembrane formation often coincide with bad breath and necrosis of the gingival margin or/and the tips of the interdental papillae.

Therapy includes debridement of the necrotic tissues, improvement of the oral hygiene, smoke abandonment, oral rinses, analgesics and appropriate antibiotics.

Vincent‘s angina

This infectious disease is caused by fususpirochetal organisms (mostly fusobacterium nucleatum in combination with treponema vincentii, which belong both to the normal flora of the mouth). Its pathology is still unknown but assumed to be associated with poor oral hygiene, smoking, trauma or stress and is predominantly seen in young men. It starts abruptly with fetor ex ore, ulcerative, mostly unilateral tonsillitis with yellow-green coated, sharply defined ulcers. Sometimes it is accompanied by lymphadenopathy or fever but only rarely is the general condition reduced.

A visual diagnosis is normally sufficient. Antibiotics like Penicillin G or V are the treatment of choice.

Impetigo contagiosa

Impetigo contagiosa is a highly contagious infection of the skin caused by group A beta-hemolytic Streptococci and Stphylococcus aureus. It is the most common pyoderma in children, transmitted by smear infection.

Of the two existing types, bullous and nonbullous impetigo, the nonbullous type is far more common, however, combined versions are possible.

The typical skin manifestation of the nonbullous impetigo starts with pimple-like lesions surrounded by reddened skin predominantly located on face, arms and legs. After a few days the lesions fill with purulence, and after they have burst, they build thick honey-yellow crusts which

mostly create an itching sensation. The bullous type of impetigo shows bigger lesions, 2-5 cm bullae, which are filled with serous fluid.

The treatment options are oral or topic fusidic acid, mupirocin or antibiotics. Complications like glomerulonephritis are possible but rare.

Furuncle/ Carbuncle

A furuncle is an infection of the hair follicle and its surrounding tissue, colloquial known as „boil“ or „abscess“, mostly caused by the pathogen staphylococcus aureus. The necrosis of the follicle causes a painful, erythematous, fluctuant or firm boil. The containing pus either drains spontaneously or an incision of the furuncle is induced. Afterwards a blue-red erythema remains for several days and heals with a delicate scar formation.

In the oral mucosa a furuncle is not to be found but perforations in the oral cavity are possible and if a furuncle is located above the upper lip, the complication of a sinus thrombosis must be considered.

A carbuncle results from the confluence of several furuncles and can be accompanied by fever and/or fatigue. The infection potentially spreads to other areas of the body and is contagious. Furuncles/ carbuncles normally heal within 2 weeks on their own. Antibacterial soaps or antbiotics can provide complications.

Zoonosis

Zoonosis is a collective term for infectious diseases which are primarily transmitted between animals and humans. Parasites, fungi, prions, viruses or bacteria can be the infectious agents. Today about 200 zoonotic diseases are known. The table below and the following images, provide a comprehensive overview of the most common zoonotic diseases.

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6.3.7. Aphthae

Definition

An aphtha represents a well-defined, either round or oval ulcer in the oral mucosa which is covered with a white-yellow pseudomembrane and mostly painful. It is surrounded by a margin and an erythematous halo. The most frequent aphthae are represented by the recurrent aphthous stomatitis (RAS) which affects 5-25per cent of the general population and is therefore plausible to also be the most common and recurrent inflammatory ulcerative condition of the oral cavity of healthy individuals. A localized burning or pain 24-48 hours in advance characterizes the typical prodromal symptom of RAS. The treatment is symptomatic.

If an aphthous ulcer is accompanied by symptoms like genital ulcerations, arthritis, adenopathy, fever or uveitis, a systemic etiology should be considered.

There are also some conditions which (indeed) have the same appearance like aphthae but actually are chronic diseases.

Recurrent aphthous stomatitis (RAS)

Minor aphthae

The minor aphtha, alternatively called Mikulicz's aphtha or mild aphthous ulcer, is with about 80 percent the most common among all the aphthous lesions. Its diameter is not more than 10mm and it is mostly located on the labial mucosa but is possible to occur in every nonkeratinized mucosa of the mouth. Minor aphthaes take 10-14 days to heal and do not leave any scar.

Major aphthae

Major aphthous ulcers, also known as periadenitis mucosa necrotica recurrens (PMNR) or Sutton‘s disease, normally first occur after puberty. The ulcer is deeper than the one caused by the minor aphthae, its diameter is more than 10mm, prodromal pain is more intense and it can last from two weeks to several months. Fauces, lips and soft palate are commonly the affected areas. Major aphthae sometimes are accompanied by fever, malaise and dysphagia. Scarring is possibly during the healing process.

Herpetiform aphthae

The herpetiform aphthae is a seldom condition which shows multiple (5-100)(,) grouped ulcers with a diameter of 1-3 mm. The lesions are able to fuse and turn into larger ulcers. They remain for 10-14 days.

Etiology and treatment

The reason for the onset has not yet been clarified. It is suggested that the etiology is multifactorial with predisposing factors like trauma, microbial factors, stress, foods, family tendency, drugs, immune disturbances, hormonal imbalance, smoking as well as immunologic ingredients.

Due to the still unclear etiology, the treatment is reduced to suppressing the symptoms, decreasing the time of recovery and decreasing the frequency of recurrence. There is a wide selection of therapy approaches. The most effective methods are listed below:

Topic therapy options:

- Corticosteroids (only short-term use!)

- Clofazimine

- Benzydamine

- Antibiotics: Penicilline G, Tetracycline (contra-induced in children)

- Local anaesthetics

Systemic therapy options: (->only induced in severe cases or with associated systemic disorders!)

- Corticosteroids (only short-term use-> side effects!))

- Colchicine

- Azathioprine, methotrexate and cyclosporine A (Cave-> side effects!)

Associated systemic disorders

Behcet‘s disease It is a systemic disorder characterised by recurrent oral aphthous-like ulcers together with at least two of the following symptoms: genital aphthous-like ulcers, ocular inflammations, skin lesions, vasculitis, transient arthritis of the peripheral joints.

Reiter‘s syndrome Typical symptoms are arthritis, urethritis, conjunctivitis and 10per cent of patients manifest oral aphthous-like ulcers.

Hematinic deficiency About 25per cent of RAS patients show deficiencies in zinc, iron, folic acid or some vitamins which can affect the immune system and can have an association to RAS.

Gastrointestinal disease Celiac disease can be a reason for a vitamin B and foliate deficiency and may lead to RAS. A complete remission of the aphthae is possible by a gluten-free diet.

Sweet‘s syndrome The symptomatic triad of the rare Sweet‘s syndrome comprises fever, erythematous plaques or nodules and an increase in neutrophils. Aphthous-like oral lesions are an often concomitant.

Cyclic neutropenia Symptoms include RAS (especially the minor type), malaise, fever, skin infections and cervical adenopathy for about 3 weeks each time. Gingivitis, loss of alveolar bone and tooth-loss can accompany the cyclic episodes.

MAGIC The „mouth and genital ulcers with inflamed cartilage syndrome“ includes polychondritis, arthritis and cutaneous pustules together with symptoms of Behçet‘s disease.

PFAPA The „periodic fever, aphthous stomatitis, pharyngitis and adenitis syndrome“ includes intervals of that symptoms which start in early childhood and last for years. The patients are completely healthy in between the episodes.

Aphthous ulcerations in chronic diseases

Chronic ulcerative stomatitis

CUS is an autoimmune disease with specific antibodies directed against a part of the epithelium. It shows painful, erosive, ulcerative lesions which are mostly located on the tongue and gingiva but also possible in all oral mucosal surfaces mainly among older women. The diagnosis requires biopsy and direct immunofluorescence examination. Therapy with hydroxychloroquine provides the best results.

Necrotizing ulcerative gingivitis

NUG is characterised by ulceration of the interdental papillae and parts of the gingiva. The gingival mucosa aches, looks very red and is swollen. Additionally, the gingival margins necrotise and build craters covered with a yellow-grayish layer. Further symptoms include spontaneous bleeding, fever, lymphadenopathy and halitosis. Although the direct cause for the aforementioned symptoms has not yet been determined, both anaerobic microorganisms and certain predisposing factors like smoking, poor hygiene, immune deficiency and malnutrition are thought to be involved. Treatment options are antibiotics, initial debridement and antibacterial mouthwashes.

Other

Bednar‘s aphtha

An aphthous-like, not very deep, epithelial defect of a newborn infant‘s oral cavity is called Bednar‘s aphtha. Typically the aphthae is not round but rather the shape of a butterfly. The Bednar’s aphtha is commonly located close to the tonsils where the soft palate begins. It is a fairly frequent condition and can be observed in about 15per cent of newborns. Although the cause of Bednar’s aphtha is still unknown, it is closely linked to mucosal hyperaemia, nutrition with formula and spontaneous birth at term and it might, thus, be an immunological reaction to the antigens a neonate is exposed to during the first days after birth. The aphtha heals within a few days and does not need any treatment.

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6.3.8. Nosological forms cycle

Definition

„Nosology“= pathology; systematic classification and description of the diseases

This chapter contains the clinical presentations of lesions which are the result of mechanical, thermic or chemical injuries and accidents as well as injuries caused by different mental or psychosocial handicaps or psychiatric diseases.

A reliable anamnesis together with the clinical presentation often leads to the diagnosis. Accordingly, a detailed description of the following themes is not given at this chapter.

Scratching, cutting, „self-mutilation“

Scratches may be caused by animals or by various activities but also in terms of self-injury. Self-mutilation is an addictive form of self-aggression. With repeated self-inflicted injuries, the patients stimulate or punish themselves, in an attempt to try to reduce inside tensions or wanting to gain attention and devotion. Self-mutilation is mostly associated with psychiatric disorders.

Bite wounds

A bite injury is caused by a human- or animal-bite. The contamination of the wound through the oral bacterial flora is obligate. There is a wide variability of wound-forms with a high infection rate. The wound margins are mostly irregular and the bite wound is a combination of laceration and contused wound.

Orthodontic appliances

Various orthodontic appliances can provoke injuries of the oral mucosa caused by pressure or friction. Prolonged pressure can lead to pressure necrosis. Poorly fitting dental prothesis may have the same effects.

Mechanical injury or burn

Mechanical injuries can be caused by various different objects placing in the mouth.

A burn or combustion is a thermic tissue injury caused by the effect of heat. The results are local hyperemia and coagulation necrosis.

Habit/ Addiction

A habit is an action which was repeated again and again, often unconsciously, and therefore became routine. A wide range of habits exist, some occur more, others less frequently.

Some typical examples are twirling hairs, licking fingers, lips licking, lips biting, chewing fingernails and much, much more.

An addiction is a pathological dependency, meaning an excessive longing for something or for a particular doing. A typical example is smoking or the consumption of snus.

Accident

An accident is an incident, which happened unintentionally and led to injuries. The variety of the injury can be very wide.

Abuse

An abuse is an injury caused by another person, a malicious neglect, a torture of a child. This could occur in terms of physical and psychological violence or neglect.

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6.3.9. Allergic disorders

Definition

Allergies are characterised by unnecessary and excessive immune response to harmless substances like for example pollen.

In literature, various classifications of allergic disorders are being discussed. The following chapter makes use of the hypersensitivity reaction types 1-4 that have been outlined by Coombs and Gell 1963. Type I is the allergy of immediate type. Type II includes the autoimmune diseases. Type III is autoimmune-complex mediated and type IV describes the „autoantibody-free“ type, conversely known as delayed hypersensitivity reactions.

If the typical allergic symptoms like urticaria, asthma, anaphylaxis or potentially fever, skin rash etcetera occur, a drug hypersensitivity reaction should always be taken into consideration. Therefore, an anamnesis including the drug intake of the last month is needed.

Treatment options include a discontinuation of the causative allergen or drug (if possible) by what the symptoms should eliminate within two weeks and symptomatic respectively supportive therapy by corticosteroids and antihistamines.

Type I

The hypersensitivity reaction type I describes the fast response within minutes to hours. The involved mediators are IgE. The release of various vasoactive biomolecules provokes local symptoms like rhinitis, vomiting, diarrhea and urticaria or, in an increased form, systemic symptoms like bronchoconstriction and anaphylaxis which can be fatal without treatment.

A testing by means of a skin test for specific IgE can be undertaken.

Examples for a type I reaction are allergic asthma or hay fever. In the dental practice a latex-allergy should be always considered.

Type II

For yet unknown reasons, antibodies are produced (Specific IgG or IgM) which turn against the body‘s own structures instead of foreign matter or parasites. They are called autoantibodies. The antibody-dependant cell-mediated cytotoxicity is activated and leads to the destruction of the afftected cells. Clinical manifestations are hemolytic anemia, thrombocytopenia and neutropenia.

Examples of a type II reaction are autoimmune hemolytic anemias, idiopatic thrombocytopenic purpura or rheumatoid arthritis.

Type III

Drug-antibody complexes depose in the tissue and cause complement activation and inflammation. It takes 1 to 3 weeks after drug intake/exposure. Nearly every drug or bacterial decomposition toxin may be a potential trigger. Fever, rash, swelling, lymphadenopathy, urticaria, vasculitis, arthralgias, serum sickness or glomerulonephritis are typical manifestations.

An example of this is the fith disease (erythema infectiosum).

Type IV

The so-called „delayed hypersensitivity reaction“ occurs due to a linking between a per se non immunogenic allergen and a (body‘s own) protein which is able to induce an immune reaction (T-cell-B-cell cooperation). The then produced cytokines and inflammatory mediators lead to an increased activity of macrophages respectively to a phototoxic reaction. Normally, clinical manifestations like erythema, papules and/or blisters occur 2 to 7 days after the cutaneous drug exposure.

Typical examples are contact dermatitis, Steven-Johnson syndrome, chronic asthma or chronic allergic rhinitis.

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6.3.10. Pigments and colour changes

Definition

Colour changes in and around the oral cavity are very frequent and occur in a large variety. Accordingly a correct diagnosis is often not easy to find. Therefore, it is important to obtain a careful anamnesis and a detailed documentation of the lesion.

The anamnesis should include family history, smoking or other habits, change in pattern, drugs use, onset and duration of the noticed colour change. Attention must be paid on location, colour and distribution of the pigmentation as well as the pigmentations on the facial skin, especially the perioral area and the lips should be observed. In addition, the presence of systemic coexisting symptoms should be examined.

Although anamnesis and clinical findings may be a help in finding the aetiology of the colour change, a definitive diagnosis requires almost exclusively a histopathologic evaluation. Also diascopy, radiography and laboratory investigations like blood tests can be of help to reach a definitive diagnosis.

In this chapter, the different pigmentations are divided into „exogenous“/ „endogenous“ pigmentations and „other colour changes“ due to their aetiology.

Exogenous pigmentation

Amalgam tattoo

An amalgam tattoo or amalgam pigmentation is the most frequently seen colour change with exogenous origin in the oral cavity. It occurs due to traumatic application of dental amalgam into mucosal tissue. Accordingly, the even macula typically adjoins the amalgam restauration (or where one used to be) and is most often located on the gingiva and alveolar mucosa. Depending on whether the metal is deposited in solid fragments or in numerous fine granules, the size and

form varies between irregular blue to dark grey coloured maculas, diffuse dispersed pigmentation or a combination of both.

A radiograph represents (larger) metallic particles and helps to confirm the diagnosis.

Except for cosmetic reasons, a treatment is not induced.

Other colour pigmentations

Chronical quicksilver or bismuth intoxication show scalloped pigments along vessels and basal membrane of the gingiva. Additionally the pigmentation is often followed by hypersalivation and metallic taste.

Silver or gold pigmentations represent as blue-violet discoloration of the gingival margin.

Plumbism causes bluish-black discolorations in the gingival tissue. It happens only in patients with natural dentition and almost entirely in people who work with lead.

Children often take objects like crayon or coloured pens into their mouth which, in turn, easily leads to discolorations. This must always be taken into consideration. Therefore a complete anamnesis is absolutely essential.

Black stain

This common discoloration or special form of oral plaque is exclusively located on the tooth surface, especially on primary teeth, and caused by chromogenic bacteria. Insolvable iron sulphide gives a black colour to the, parallel to the gum line scalloped, running dots. The prevalence in children is about 4-8 per cent.

The chromogenic bacteria are mostly harmless and assumed to even be a protective factor for dental caries. Therefore, no treatment is indicated. For esthetic reasons there may be a professional cleaning every few month useful. Fast recurrences of black stain is common.

Endogenous pigmentation

Physiological/ „racial“ pigmentation

A physiological melanin-pigmentation of the gingiva is induced by melanocytes which are as well as in the skin also present in the oral mucosa. Whereas the melanocytes of the oral mucosa in the majority of the white population clinically are unremarkable, they are commonly occurring in darker pigmented peoples, especially in African and Afro-American.

The melanin-pigmentation is typically diffuse and bilateral, can run ribbon-shaped as well as spotted and is most often located on the attached gingiva, but is also possible in other areas, especially on the buccal mucosa. This pigmentation represents a physiological condition which needs no therapeutic intervention.

Nevus

The nevus, colloquially known as mole or birthmark, is an either congenital or acquired malformation of the skin, representing a benign neoplasm of cutaneous melanocytes.

Melanocytic nevi are sharply defined, vary greatly in shape (but are symmetric), are uniformly coloured and appear commonly as slightly raised papule. The intramucosal nevus represents the most frequent subtype of the nevi. It is brown in colour and most often found in the buccal mucosa. The similarly common blue nevi are most frequently located on the hard palate.

The majority of nevi develop on the skin, making the oral mucosa a rather rarely affected area. The average age of affected humans is 38 years.

Rare cases of nevi turning into malignancy are reported.

Hematoma

A hematoma is a bruise caused by a trauma, after surgery or in patients with coagulation disorders. Normally the traumatised area shows a bulging hemorrhage in the subdermal tissue which is, depending on its stage of healing, differently coloured.

The injured tissue mostly heals naturally within 2 to 3 weeks and needs, except of cooling, no further treatment.

Smoker‘s melanosis

Tobacco smoke contains noxious agents which can cause an immunological response of the melanocytes which, in turn, increase their production of melanin. As a result brown-black lesions show up which are mainly located on the anterior labial gingiva, followed by the buccal mucosa. This phenomenon occurs in about 20per cent of all smokers and is likely to fade out after smoking cessation inside of three years.

Drug-induced pigmentation

In some individuals, drugs cause an inflammatory reaction which can induce the so called „postinflammatory hyper-pigmentation“. It‘s a non-specific reaction leading to pigmentary changes. Some examples of the most common drugs associated to oral pigmentation are: Cotrimazole, tetracycline, arsenic in combination with sulphydryl groups, phenothiazines, minocyclines and many others have been implicated.

Typically the pigmentation shows a slate brown color and is more often seen in dark-skinned people.

Systemic diseases with oral/facial pigmentation

Some diseases and syndromes can cause oral and/or facial pigmentations. You will find a selection of the most common examples in the chapter Dermatological and systemic illnesses.

Other colour changes

Follicular cyst

A follicular or also called dentigerous cyst surrounds the crown of a yet non- (or partially) erupted tooth. It develops due to fluid accumulation between the crown and the reduced enamel epithelium. Mostly the third molar or the upper canines are involved. Normally, common cysts remain and grow initially asymptomatic unless the cyst contents get infected, pain, pus and/or colour changes of the overlaying mucosa result. The color varies from blue-black, purple, bluish to transparent. The radiography shows a well-demarcated radiolucent, unilocular lesion surrounding the crown of the erupting tooth. Therapy lies in cyst enukleation and tooth removal as the circumstances require. But, in most cases, the cysts disappear spontaneously and the teeth are able to erupt in normal patterns without further treatment.

Hemangioma

This benign proliferation of the endothelial cells of blood vessels appears as a blue-red, soft, flat or slightly bulging lesion, which characteristically disappears under pressure. In the oral cavity, hemangioma are rather rare and mostly located on the tongue.

Normally they show up during infancy and can spontaneously decrease with increasing age.

Leukoplakia

Oral leukoplakia is the most common pre-malignant oral lesion. It is defined by the WHO as „white patch or plaque which cannot be characterized clinically or pathologically as any other disease. If the lesion is red coloured, it is called erythroplakia and if it is a combination of both erythroleukoplakia. The lesion occurs normally after the age of 30 and the prevalence increases with age. Smoke and alcohol abuses are the most important etiological factors. Some viruses, including HPV types, are assumed to be associated with malignant transformation. Ulcerative,

verrucous or erosive leuko-/erythroplakias as well as such located on the floor of the mouth or on the tongue have a high malignant tendency. Therapy lies in eliminating potential causes, surgical removal and long-term follow-up‘s.

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6.3.11. Dermatological and systemic illnesses

Definition

A wide range of dermatological, systemic or autoimmune illnesses manifest lesions and changes in and around the oral cavity. A dentist should be able to recognize such changes because an early diagnosis is often of great importance.

Blisters are among the most common forms of intraoral lesions. Beneath inflammatory, physical or toxic origins there are also congenital or acquired forms. Characteristically, the latter two forms distinguish themselves from the others by displaying multiple, chronic lesions which persist for prolonged periods.

Bullous autoimmune illnesses appear due to autoantibodies against coherency proteins. Besides, metabolic disorders can have the same manifestation and also lead to a structural weakness of both the skin and mucosa.

Avitaminosis and deficiency diseases may also affect the oral mucosa. More often seen in Third World countries and therefore rarely in Europe, avitaminosen and deficiency diseases are not further discussed in this chapter.

Attention! The following titles represent just a „small“ selection of dermatological and systemic illnesses. The aim of this chapter is not to list all possible diseases which can have manifestations in the oral cavity, but rather to convey the notion that the origin of an oral lesion does not always need to originate in the oral cavity.

Immune dermatosis

Lichen planus

Oral lichen planus is a common autoimmune chronic inflammatory disease which affects about 2 per cent of adults. The reticular form shows bilateral, white, asymptomatic striations (Wickham‘s striae) or papules, mostly located on the buccal mucosa. The erosive form appears as painful ulcers with white borders (radiating striae). If the erythema and ulcers are generalized, it is called desquamative gingivitis. In asymptomatic patients, no treatment is required. Otherwise topical corticosteroid gels may be indicated. Periodic follow-up are recommended because the condition is assumed to be associated with an increased risk of malignancy.

Pemphigus vulgaris

Of the various pemphigus diseases in existence, the P.vulgaris is the most common with an incidence of 0.1-0.5 in 100‘000. This auto-immune blistering disease first occurs mainly between the ages of 40 and 60. It manifests as lesions in the oral mucosa which are followed by skin lesions after some months. The bullae, or other general erosions, which are predominantly located on the buccal mucosa, are very painful, may be pruritic and are usually attended by a burning sensation. On the skin, the lesions are fragile blisters which rupture easily and look more like crusted erosions. The Nikolsky‘y sign is positive. The general condition may deteriorate.

Appropriate immunosuppressive agents are immediately indicated.

Pemphigoid

This autoimmune skin disease is marked by subepidermal blistering respectively tense, large bullae. Normally it occurs after the age of 60 and rarely in children.

The lesions of the bullous P. are spread over the whole skin of the body. Oral manifestations appear in only 10-30 percent of the cases.

The cicatricial P. is rather rare and involves mostly mucous membranes especially the oral mucosa and the conjunctiva. The skin in in only 30 percent of the cases involved. It can lead to chronic conjunctivitis, scarring and blindness.

Whereas the bullous P. is self-limiting within months to years, a spontaneous regression in the cicatricle P. is very rare. Therefore, immediate treatment with immunosuppressive agents is indicated. Surgical intervention could improve the quality of life or may be useful to restore the function but not to heal the disease.

Lupus erythematosus

This rather seldom connective tissue disease includes two lupus-forms: the systemic and the discoid lupus erythematosus. The systemic L.e. starts with rashes on the skin and joint pains, nevertheless all organ systems may be affected. The oral mucosa is in about 20 % of the cases involved.

The oral discoid form is characterised by telangiectasias, an ulceration or erythema framed by radiating, white striae. The lesions are most often located unilaterally and on the palate.

The cause is still unknown, but has a multifactorial pathophysiology.

Although the disease could be self-limiting, topical corticosteroids or systemic immunosuppressive therapy may be useful.

Erythema exsudativum multiforme

The erythema exsudativum multiforme, or also known as „Steven-Johnson-Syndrome“, is a rare mucocutaneous disease primarily caused by drugs, but also by some infections or other not yet defined factors. Young men are predominantly affected.

The cardinal signs are swollen, bleeding, crusted lips and erosions/ ulcerations of the oral mucosa. Conjunctivitis, erythemas of the skin, fever and malaise are frequent. Treatment lies in supportive care, various immunomodulating therapies are discussed. The Mortality stays high despite all therapeutic efforts.

Syndromes

Peutz-Jeghers syndrome

Intestinal hamartomatous polyposis, mucocutaneous macules combined with an increased risk of carcinomas of the gastrointestinal tract, breast, thyroid and pancreas define the so called Peutz-Jeghers syndrome. This inheritable disease occurs normally within the first three decades of life and manifests symptoms like abdominal pain, rectal bleeding, anemia or obstruction. In the facial region it shows black-to-brown spots, mostly located in the perioral area and on the lower lip but also possible on the oral mucosa. The macules themselves are benign, less than 1mm in diameter and likely to disappear during adolescence. Life-long cancer screening, as well as gastrointestinal polyp resolutions are recommended.

Melkersson-Rosenthal syndrome

This uncommon disorder of unknown ethiology manifests a triad of symptoms including fissured tongue, recurrent episodes of unilateral orofacial swelling (labial oedema) and recurrent unilateral facial paralysis. If the swelling just involves the lips, the disorder is called cheilitis granulomatosa.

The treatment remains challenging; corticosteroids and physical therapy are the current approaches.

Hematological diseases

Thrombocytopenia

Thrombocytopenia refers to a relatively reduced quantity of platelets in the blood. This condition leads to several minor traumas during normal functions like swallowing and chewing. The lesions may include petechiae, purpura, gingival bleeding and further also hemorrhagic bullae or hematoma.

The decrease of the thrombocytes has wide variety of possible causes including different diseases, deficiencies and drugs.

Therapeutic intervention depends on the etiology and severity of the condition.

Leukemia

Leukemia is a neoplasia of the hematopoietic and lymphatic system with an abnormal increase of immature blood cells. Besides a wide range of systemic symptoms there are also oral manifestations. They include petechiae, ulceration, mucosal bleeding, swelling and redness of the gingiva and enlarged lymph nodes. Secondary complications due to the reduced immune system like candidiasis, periodontal bone loss etc. may occur.

Endocrine diseases

Addison‘s disease

This chronic adrenal insufficiency is a rare disease in which the adrenal glands do not generate enough steroid hormones. A characteristic manifestation is a diffuse dark pigmentation of the oral mucosa and skin. Other symptoms may be relatively nonspecific like nausea, anorexia or postural hypotension.

In the oral cavity the increased pigmentations can be found solitaire localized or involve nearly the whole mucous membrane.

A specific treatment of the pigmentations is not necessary. The oral lesions are likely to disappear as a result of the treatment of the Addison‘s disease itself.

Diabetes mellitus

DM is the most common endocrine disease and is defined as a complex multi-systemic disorder due to an absolute or relative insulin deficiency with differing aetiology.

Symptoms in the oral cavity occur predominantly in individuals with badly controlled diabetes. Oral symptoms manifest themselves as a dry smooth red colored tongue, signs of candidiasis like cheilitis angularis and many adverse effects on the periodontium which is associated with periodontitis.

Perfect oral hygiene mostly lead to a fast relief of the oral symptoms.

Metabolic diseases

Crohn's disease

Morbus Crohn is a granulomatous disease which can affect the whole gastrointestinal tract including the oral cavity. Typically the disease is chronic and progresses in stages with phases of exacerbations and remissions. Mostly it occurs between the ages of 15 and 35, as well as 60 and 80. Symptoms range from diarrhea, stomach upset and weight loss to fever.

In the oral cavity, characteristic changes are hyperplasias and ulcerations of the mucosa mainly located bilaterally and in the vestibule.

Treatment options are glucocorticosteroids, TNF-a-blockers, azathioprine/methotrexate partial in combination with surgical interventions.

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6.3.12. Tumors

Definition

A tumor is a locally instructed increase of the volume of tissue. That could be a localised mass or swelling for example caused by an edema, as well as a formation of new tissue. The latter is also known as neoplasia.

Most tumors of the oral cavity are benign tumors. A benign neoplasia often contains a capsule and/or a controlled cell growth of a cell population.

Malignant tumors manifest an uncontrolled cell growth, containing mutated cells, a destructive and tissue-infiltrating increase with formation of metastases. For the diagnosis, microscopic analysis is still the gold standard.

It is important for a dentist to recognize if a lesion needs to be biopsied before he starts a treatment. As a general rule, every suspicious lesion which persists for more than two weeks after the possible irritating factor has been removed, should be biopsied.

Lipoma

Commonly known as adipose or fatty tumor, a lipoma is a very common in adults but seldom occurring in children, benign, slowly growing adipose tissue neoformation. Mostly found in the subcutis of the limbs or the truncus, it appears also, but rather rarely, in the oral region (then preferring the buccal mucosa). A lipoma presents itself as an asymptomatic, well-circumscribed, fluctuating, yellowish mass of mature fat cells. If the tumor grows to a size that causes problems in terms of mastication, speech or aesthetic reasons, excision is the treatment of choice.

Fibroma/ fibromatous lesions

Fibromas or fibromatous lesions are mostly benign soft tissue tumors which exist in various forms depending on their etiology. Chronical irritations for example due to prosthesis or orthodontic device can cause fibrous hyperplastic neoformations, which are called epulis if located on the gingiva. Pyogenic granuloma appear commonly during pregnancy, feel smooth and are red to purple coloured, grow rapidly and are easily bleeding. Fibromatosis is a familiar predisposed or drug-induced (by phenytoin, cyclosporine A, and various calcium channel blockers) gingival hyperplasia. The generalised fibromatosis, Morbus Recklinghausen, is characterised by increased pigmentation and multiple fibromas of skin and mucosa with involvement of various other organs.

Depending on the lesion, treatment options are excision, curettage or (repetitive) gingivectomy combined with careful oral hygiene.

Hemangioma

This benign proliferation of the endothelial cells of blood vessels appears as a blue-red, soft, flat or slightly bulging lesion, which characteristically disappears under pressure. In the oral cavity, hemangioma are rather rare and mostly located on the tongue.

Normally they show up during infancy and can spontaneously decrease with increasing age.

Lymphangioma

This congenital, benign malformation occurs mostly on face, neck or armpits and during early childhood, seldom in adults. Located on the tongue, known as macroglossia, it presents as a cavernous lesion elsewhere as cystic lesion. Macroglossia causes obstructing symptoms and aesthetic problems.

The treatment of choice is surgical resection or sclerosing therapy.

Retention cyst

A retention cyst or mucocele occurs due to a blockage followed by accumulation of saliva in the efferent duct of a gland leading to its dilatation. Clinically, there is no difference apparent between retention cysts or extravasation cysts, both are bulging and bluish, but the retention cyst is less frequent. If the cyst is located in the ductus of the glandula sublingualis, it is called Ranula. Its extending diameter and fluctuant mass often leads to discomfort with swallowing. Either rupture or blockade of the duct can be the cause.

Marsupialisation is the treatment of choice.

Extravasation cyst

An extravasation mucocele occurs due to a rupture of the ductus of a salivary gland. As a consequence the secretion of the gland flows into the soft tissue around it, producing a mucous accumulation there, leading to an inflammatory reaction. Therefore an extravasation cyst is correctly a pseudo-cyst because there is no epithelial lining.

These mucoceles appear mostly on the lower lip, seldom on the floor of the mouth or the buccal mucosa.

Normally they look like bluish colored bulging tumors with a diameter no more than 1 cm.

The caused tenderness and the high recurrence rate of that mucocele make its total excision meaningfully.

Salivary gland tumors

Tumors of the salivary glands are complex neoplasms with a number of heterogenous lesions with different biological behavior. Generally women are more often affected than men. About 80per cent of all salivary gland tumors in the oral cavity are benign, whereas malignancy predominantly occurs in the minor salivary glands. Of all the oral glands, the glandula parotis is

with 80per cent the most frequent tumor. Clinically, it shows a slowly growing swelling which is able to be palpated well. Pleomorphic adenoma is the most common tumor of all salivary glands, followed by the Papillary cystadenoma lymphomatosum (Warhin tumor) and the basal cell adenoma.

Surgical removal is normally the treatment of choice.

Virus induced tumors

Verruca vulgaris are common warts in children and adolescents but also in HIV-infected adults due to the human papilloma virus. Mostly, they occur on the hands, but also in the buccal mucosa, the gingiva or the alveolus as well-circumscribed, cauliflower-like lesions.

Condyloma acuminatum are rare in the oral cavity and appear normally as multiple white or pink, small nodules, which can grow up to soft sessile, cauliflower-like tumors.

In the literature, a wide range of treatment options are discussed, but the treatment of choice still remains the surgical removal, either by laser ablation or routine excision.

Future research will probably bring more and more new knowledge about virus induced tumors.

Malignant tumors

Main risk factors for the development of malignant tumors are alcohol and smoking followed by other influences like HPV infection, poor oral hygiene, infectious agents, chronic irritation, diet and family history. Treatment options are surgery, chemotherapy, radiotherapy and chemo radiotherapy.

Oral squamous cell carcinoma (OSCC) is the most frequent neoplasia in the oral cavity. It represents 3per cent of all malignancies in the body and has a high incidence of metastases. Often, it is located next to an erythro- or leukoplakia and causes at the beginning nearly no symptoms. Therefore, it, often times, remains unrecognized for a long time.

Oral Melanoma accounts for less than 1per cent of all oral malignancies. Most commonly it occurs on the hard palate followed by the gingiva. Radical surgical excision is essential. The overall 5-year survival rate is 15per cent.

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9. Anhang

CD-ROM